



Occidental Chemical Corporation OxyChem.
A subsidiary of Occidental Petroleum Corporation

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June 26, 2006

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

RECEIVED
U.S. ENVIRONMENTAL PROTECTION AGENCY
06 JUN 29 PM 2:37

Ms. Michelle Peace
Delisting Section
Corrective Action and Waste Minimization Section, 6PD-C
United States Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202

Re: EPA Pre Petition Meeting
Limestone Clarifier Effluent, Wastewater Treatment Biosludge
Minutes of Meeting
Occidental Chemical Corporation - Ingleside Plant
EPA I.D. TXD982286932

Dear Ms. Peace:

Thank you for meeting with us on Wednesday June 21, 2006 to discuss the delisting project for our Limestone Clarifier Effluent and Wastewater Treatment Biosludge. I have attached the minutes of the meeting for your files. Our Sampling and Analysis Plan will incorporate the ideas and sampling strategies discussed during the meeting. If you have any questions, please do not hesitate to contact me at (361) 776-6160.

Sincerely,

Michael C. Maldonado
Environmental Superintendent

MCM/see:MCM453W
Attachments

cc: Elizabeth Arceneaux, P.E.

Pre Petition Meeting Minutes
June 21, 2006
Occidental Chemical Corporation – Ingleside Plant
Limestone Clarifier Effluent, Wastewater Treatment Biosludge
EPA I.D. TXD982286932

1. The meeting started at 1:00 p.m.
2. Those in attendance were Michelle Peace, EPA; Wendy Jacques, EPA; Mark Evans, OxyChem; Michael Maldonado, OxyChem; Ryan Chitwood, OxyChem; John Westendorf, OxyChem; and Lisa Arceneaux, Consultant.
3. Michelle clarified that this delisting is considered a “conditional” delisting instead of a “standard” delisting since it will have conditions associated with the delisting (verification sampling).
4. We discussed that the sampling strategy for the *Limestone Clarifier Effluent* should include a description of the different scenarios of influent streams under typical operating conditions. These different operating conditions should occur during the delisting sampling.
5. The sampling strategy for the *Wastewater Treatment Biosludge* should include sampling during the worst-case scenarios in terms of listed wastes (i.e. when the influent to the limestone clarifier is being diverted to the Equalization Tank).
6. We discussed the potential to add a third stream to the delisting to eliminate any possibilities of “K” or “F” listed wastes existing in the biotreatment system. The third stream may be the effluent from the biotreatment system clarifier.
7. Michelle Peace stated that DRAS Version 3.0 will be used for this delisting and it should be available for public use around September 2006. She stated that the health-based limits had been updated and some of the assumptions of the risk assessment algorithms were verified and modified. The new Maximum Contaminant Level (MCL) for arsenic has been included in the program. The MCL recently changed from 0.05 ppm to 0.01 ppm. EPA will provide a copy of the DRAS model on CD to Lisa Arceneaux upon request.
8. Michelle Peace stated that EPA would accept analytical methods other than EPA-approved methods if the petitioner can demonstrate that the alternate method can achieve better detection limits or provide more reliable data for certain analytes.
9. We discussed that when evaluating TCLP data using the DRAS model, the drinking water ingestion pathway is the most reasonable one to use for determining delisting levels.
10. Michelle stated that she would prefer four samples of the Limestone Clarifier Effluent and four samples of the Wastewater Treatment Biosludge for the delisting petition. A

duplicate of each is also required. OxyChem can use the data already collected of these two wastes for screening purposes, but not for the actual delisting.

11. For the analytical program, Michelle agreed with our proposed use of the Appendix IX list (including dioxins and furans) and the strategy of including PCBs, Pesticides and Herbicides in only one sample of each media. If none of the PCBs, Pesticides and Herbicides constituents are detected, they can be dropped from the analytical suite.
12. Michelle explained the background for the multiple pH test procedure. She stated that this was the best method proposed ten years ago. OxyChem can propose an alternate method for evaluating leaching potential of the waste streams for EPA to consider. Michelle will send John Westendorf some recent research papers on possibly improving the TCLP leaching procedure.
13. Lisa Arceneaux described the procedure proposed for collecting composite samples for the Limestone Clarifier Effluent and Wastewater Treatment Biosludge. Michelle agreed with the sampling procedures. However, for VOA analyses, Michelle did not agree with the composite sample concept and may prefer a single grab sample for volatile analyses. Michelle will look into what is acceptable for delisting purposes and let us know her decision.
14. We discussed the QA/QC sample requirements and Lisa Arceneaux presented a summary table from the draft Sampling and Analysis Plan. Michelle stated that she would consult with the QA/QC specialist in her department and let us know if this was acceptable.
15. Mark Evans and John Westendorf requested that the delisting include the flexibility for OxyChem to burn other organic waste streams from sister EDC/VCM plants without invalidating the delisting. The waste streams will be of similar nature and content as the OxyChem organic streams. OxyChem is in the process of submitting a RCRA permit modification to allow them to accept these streams; however, the modification may not be in effect prior to the delisting sampling. Michelle stated that OxyChem could collect a confirmation sample (Appendix IX list) to determine if; 1) any new constituents were detected with the delisted wastes while the new waste streams were processed and; 2) if any of the delisting levels were exceeded. Michelle stated that this sampling might happen to coincide with the quarterly verification sampling of the delisted waste streams.
16. Ryan Chitwood requested that Michelle provide OxyChem with the new Dilution Attenuation Factors for arsenic calculated by the DRAS Version 3.0 program. Michelle agreed to provide these to OxyChem. OxyChem will use this information to evaluate the screening data already collected for the two waste streams. OxyChem and EPA discussed the option of developing site-specific arsenic delisting levels based on background concentrations or other methods, if necessary.
17. The meeting adjourned at 2:30 p.m.

Ingleside Waste Delisting Meeting
6/21/06, EPA Region 6 Office

AGENDA

- I. Introductions
- II. Plant Description
 - A. Location
 - B. Regulatory Setting
 - C. Process Description
 - D. Wastes Generated
- III. Waste Stream Description
 - A. Volume
 - B. Composition
 - C. Derived from listing designations
 - D. Waste Code/Characteristics
 - E. Current Disposal Method
- IV. Delisting Justification
 - A. Type of delisting requested
 - B. Previous delisting activities at other facilities
 - C. Existing Analytical Data
 - D. Analytical Data Needed
 - E. Potential Disposal Method
- V. Potential Issues
 - A. Version of Delisting Risk Assessment Software
 - B. Arsenic MCL
 - C. Leaching Procedure
 - D. RCRA Permit Amendment
- VI. Future Activities
 - A. Petition Submission
 - B. Delisting Timeline

PRE-PETITION SCOPING MEETING CHECKLIST

- What type of delisting requested (one-time, conditional, upfront, standard).
- Waste description (EPA Waste Code Number, physical).
- Constituents for which EPA Listing is Based.
- Waste generation process/treatment process and duration of waste generation (include process diagram).
- Discussion of any existing waste sample concentrations.
- Information on waste variability over time.
- Waste variability by location in current storage or disposal location.
- Volume of waste generated (annually).
- Proposed waste disposal location, if delisted.
- Constituents of concern in waste and methods used for this determination.
- Proposed number of samples and analyses needed.
- Multiple pH test analytical results.
- Review of Petition Quality Assurance Project Plan requirements [Be sure to remind petitioner that a separate QAPP must be provided with the petition].

**Pre Petition Scoping Meeting
EPA Region 6
Occidental Chemical Corporation
Ingleside, Texas**

June 21, 2006, 1:00 p.m.

Notice of Intent Letter



May 18, 2006

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr. Ben Banipal, Section Chief
EPA Region VI
Corrective Action and Waste Minimization Section, 6PD-C
United States Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202

**Re: Notice of Intent to Delist Limestone Clarifier Effluent and Wastewater Treatment Biosludge
Occidental Chemical Corporation – Ingleside Plant
EPA I.D. TXD982286932**

Dear Mr. Banipal:

Occidental Chemical Corporation (OxyChem) operates a VCM plant in Ingleside, Texas. The plant utilizes two RCRA permitted incinerators to burn vent gasses as well as intermediate wastes generated during the production of ethylene dichloride and vinyl chloride monomer (K019, K020 and F025).

OxyChem has classified two waste streams that are generated from the treatment of the incinerator offgas as hazardous due to the RCRA mixture and derived from rules in 40CFR §261.3(b)(2) and 40CFR §261.3(c)(2). These streams are the Limestone Clarifier Effluent and Wastewater Treatment Biosludge. Both of these waste streams currently carry the codes F001, F003, F005, F025, K019 and K020. OxyChem is providing a Notice of Intent to submit a petition to delist these waste streams from the F and K listings as allowed by 40 CFR §260.20 and §260.22.

Figure 1-2 (from our Sampling and Analysis Plan) provides a simplified process flow diagram that shows the incineration off gas treatment process in relation to the Limestone Clarifier Effluent. As shown, gases from the incinerators are treated through an acid scrubber, dehumidifier column and caustic scrubber. The aqueous streams from these units flow to the Rockbox Tank for pH adjustment. The effluent from the Rockbox Tank is around 100 to 150 gallons per minute and is routed to two tanks in series for further pH adjustment. These tanks are shown on Figure 1-2 as the Primary and Secondary pH adjustment tanks. The flow then goes to a clarifier where limestone sludge (calcium carbonate) is settled and removed. The effluent from the clarifier is called the Limestone Clarifier Effluent and it no longer carries the corrosivity characteristic.

Figure 1-2 also shows the water biotreatment process in relation to the Wastewater Treatment Biosludge. As shown on the drawing, several water streams are treated in the Process Water Biotreatment System. During upset conditions, the Limestone Clarifier influent stream can be diverted to the Equalization Tank in order to process this stream in the biotreatment system. During the time that these stream diversions occur, the wasted biomass that has mixed with the diverted Limestone Clarifier stream becomes hazardous based solely on the RCRA mixture rule.

OxyChem has collected samples of both Limestone Clarifier Effluent and Wastewater Treatment Biosludge for the Appendix IX analyses including dioxins and furans. The detected constituents were entered into the EPA DRAS version 2.0 model for delisting screening, and based upon the results OxyChem feels both of these streams are very good candidates for delisting. Two other waste streams in the off gas treatment process, the Rockbox Residue and Limestone Sludge, were delisted by EPA Region VI on January 29, 1999 as a result of a successful delisting application. These waste streams are all third generation wastes that no longer carry the characteristics or hazardous constituents of the original waste streams with the F and K codes.

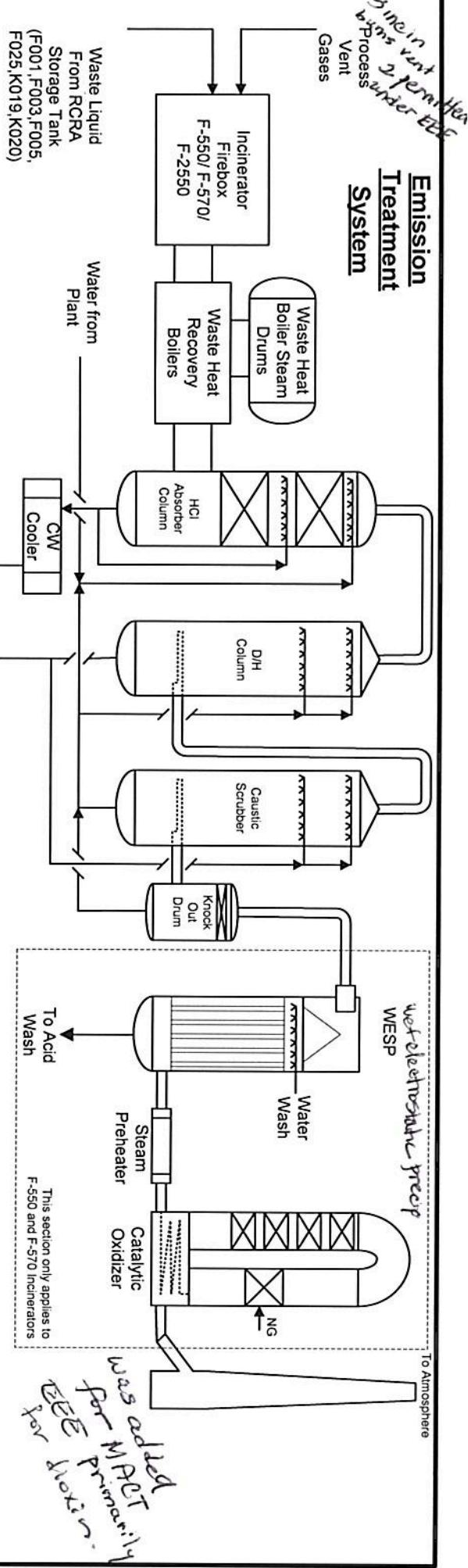
OxyChem is interested in applying for a standard exclusion for the Limestone Clarifier Effluent and the Wastewater Treatment Biosludge. We would like to meet with you and your staff to discuss the project and details of the Sampling and Analysis Plan. The week of June 12, 2006 is currently open for us. Please contact me at (361) 776-6160 to coordinate a meeting at EPA's offices in Dallas, Texas at your earliest convenience.

Sincerely,

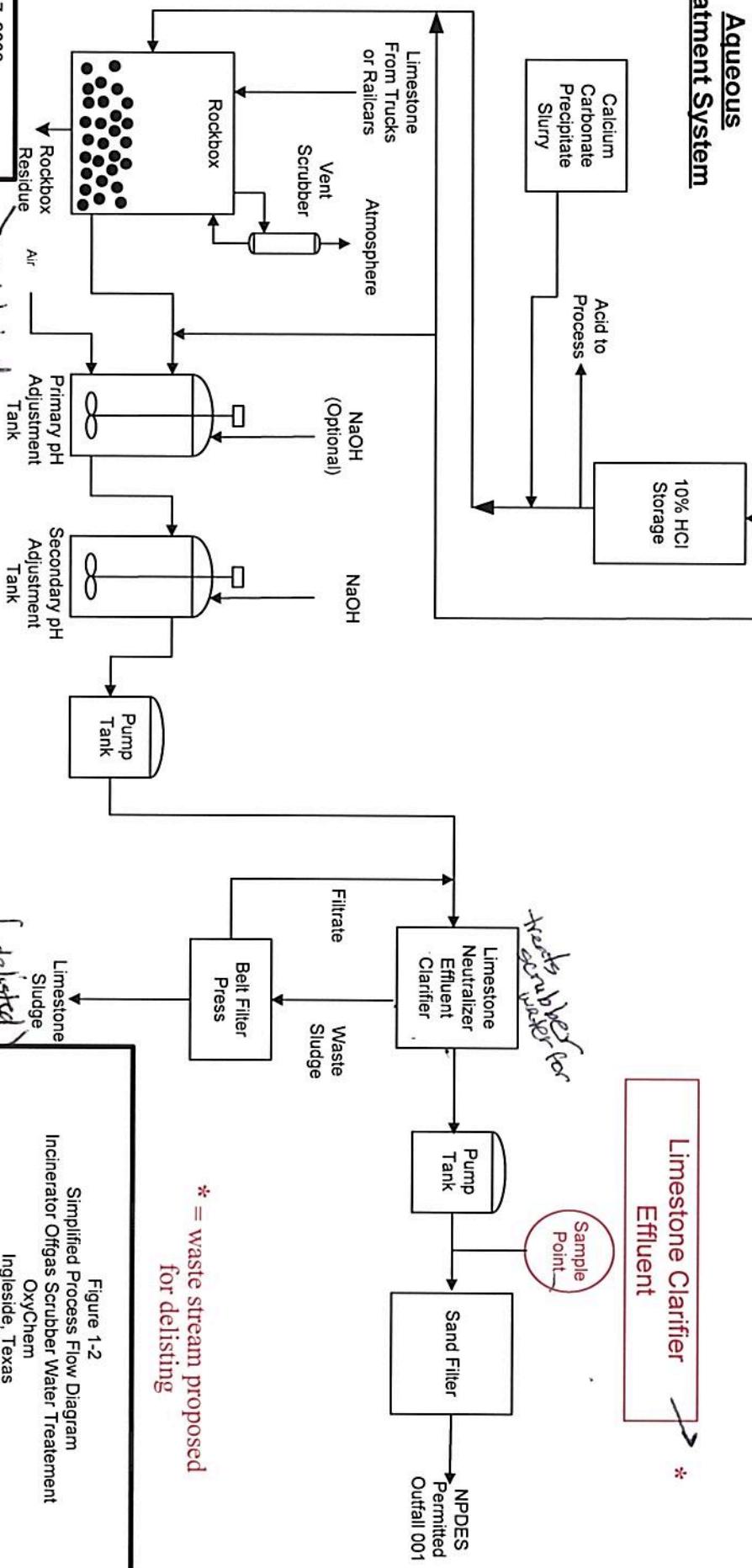


Michael C. Maldonado
Environmental Superintendent

MCM:see/T1FF452W



Aqueous Treatment System



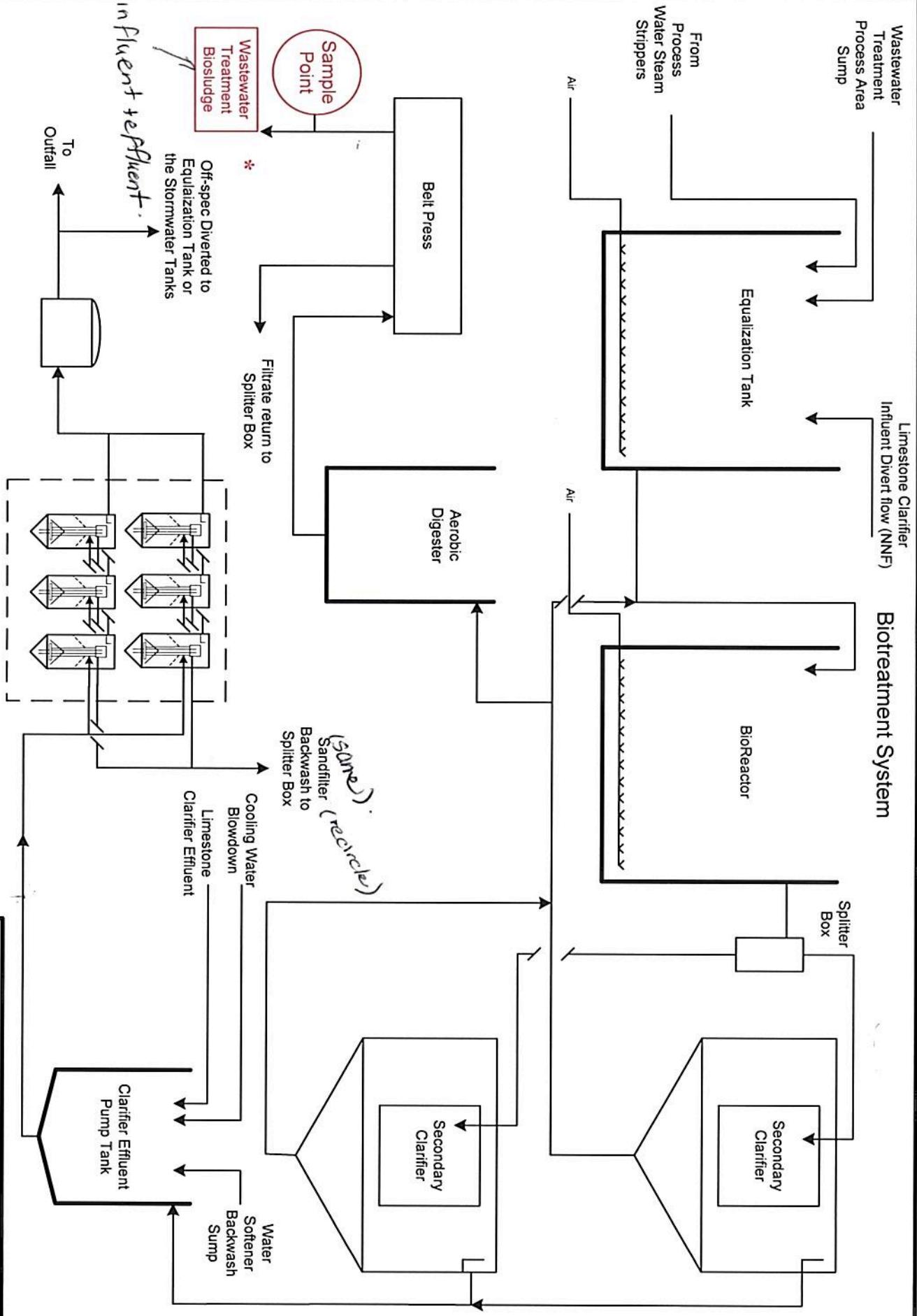


Figure 1-3
Simplified Process Flow Diagram
Process Water Biotreatment System
OxyChem
Ingleside, Texas

***Photos**

Constituents Forming the Basis-for-Listing

Table 3-1

Basis-for-Listing Hazardous Waste
40 CFR 261, Appendix VII
OxyChem
Ingleside, Texas

F001

- Tetrachloroethylene
- Methylene chloride
- Trichloroethylene
- 1,1,1-Tichloroethane
- Carbon tetrachloride
- Chlorinated fluorocarbons

F003

- N.A.

F005

- Toluene
- Methyl ethyl ketone
- Carbon Disulfide
- Isobutanol
- Pyridine
- 2-Ethoxyethanol
- Benzene
- 2-Nitropropane

F025

- Chloromethane
- Dichloromethane
- Trichloromethane
- Carbon tetrachloride
- Chloroethylene
- 1,1-Dichloroethane
- 1,2-Dichloroethane
- trans-1,2-Dichloroethylene
- 1,1,-Dichloroethylene
- 1,1,1-Trichloroethane
- 1,1,2-Trichloroethane
- Trichloroethylene
- 1,1,1,2-Tetrachloroethane
- 1,1,2,2-Tetrachloroethane
- Pentachloroethane
- Tetrachloroethylene
- Hexachloroethane

F025 (Continued)

- 3-Chloropropene
- Dichloropropane
- Dichloropropene
- 2-Chloro-1,3-Butadiene
- Hexachloro-1,3-Butadiene
- Hexachlorocyclopentadiene
- Benzene
- Chlorobenzene
- Dichlorobenzene
- 1,2,4-Trichlorobenzene
- Tetrachlorobenzene
- Pentachlorobenzene
- Hexachlorobenzene
- Toluene
- Naphthalene

K019/K020

- Ethylene dichloride
- 1,1,1-Trichloroethane
- 1,1,2-Trichloroethane
- 1,1,1,2-Tetrachloroethane
- 1,1,2,2-Tetrachloroethane
- Trichloroethylene
- Tetrachloroethylene
- Carbon Tetrachloride
- Chloroform
- Vinyl chloride
- Vinylidene chloride

Waste Generation History Incinerated Waste Streams

TABLE 2-3
VCM and EDC Plant Liquid Wastes
OxyChem
Ingleside, Texas

Components based on Annual Waste Analysis 1998-2005	VCM Plant Heavy Ends	VCM Plant Light Ends	EDC Plant Heavy Ends (a)
<u>Volatile Organics</u>			
Benzene	1000	3,500 – 8,000	ND
Chlorobenzene (mg/Kg)	300-12,000	ND	ND
Carbon Tetrachloride (mg/Kg)	300-19,000	50,000-380,000	ND
Chloroform (mg/Kg)	3,000-84,000	54,000-750,000	11,000
1,1,2,2,-Tetrachloroethane (mg/Kg)	700-26,000	ND	ND
Trichloroethene (mg/Kg)	12,000	35,000 – 78,000	ND
1,1,2-Trichloroethane (mg/Kg)	7,500-280,000	ND	73,000-110,000
1,1-Dichloroethane (mg/Kg)	500-19,000	56,000-150,000	ND
1,1 Dichloroethene (mg/Kg)	ND	3,000 – 49,000	ND
1,2-Dichloroethane (EDC) (mg/Kg)	12,000-300,000	28,000-630,000	160,000-380,000
Chloroethane (mg/Kg)	ND	8,000-32,000	ND
Tetrachloroethene (mg/Kg)	1,600-42,000	ND	ND
cis-1,2 Dichloroethene (mg/Kg)	300	4,000-61,000	ND
Trans-1,2 Dichloroethene (mg/Kg)	ND	4,200	ND
Vinyl Chloride	ND	5,200	ND
<u>Semi-Volatile Organics</u>			
bis(2-chloroethyl)ether (mg/Kg)	3,600-8,500	ND	30,000-56,000
1,3-Dichlorobenzene (mg/Kg)	680	ND	ND
1,4-Dichlorobenzene (mg/Kg)	470	ND	ND
Naphthalene (mg/Kg)	750 - 1100	ND	ND
Hexachlorobutadiene (mg/Kg)	230	ND	ND
Hexachloroethane (mg/Kg)	260	ND	ND
All other semivolatiles	ND	ND	ND
<u>Metals</u>			
Arsenic (ppm)	<1.0	<1.0	<5.0
Barium (ppm)	<1.0	<1.0	<5.0
Cadmium (ppm)	<1.0	<1.0	<5.0
Chromium (ppm)	1.0-6.0	0.7-<5	<5.0
Lead (ppm)	<5.0 – 7.0	<1.0	<5.0
Mercury (ppm)	0.1	<0.5	<0.5
Selenium (ppm)	<0.0005-7	<0.005-11	<5.0-15
Silver (ppm)	<0.5	<0.5	<5.0
<u>Parameters</u>			
Total Organic Halides (mg/Kg)	130,000-830,000	410,000-920,000	400,000-740,000
Ash Content (% by wt)	<0.02-0.06	<0.02-0.05	<0.02-0.22
Higher Heating Value (Btu/lb)	5,000 - 18,720	3,700 – 5,214	6,894

Notes:

(a) Idled the EDC plant in 2000. Annual waste analysis data is for 1998-2000

TABLE 2-3 (Continued)

VCM and EDC Plant Liquid Wastes^a
OxyChem
Ingleside, Texas

Components Based on Trial Burn Data (10-15-02 through 10-18-02)	VCM Plant Heavy Ends	VCM Plant Light Ends	EDC Plant Heavy Ends
<i>Volatile Organics</i>			
Vinyl chloride monomer (wt %)	—	0-5	—
Carbon Tetrachloride (wt %)	—	0-15	—
Chloroform (wt %)	0-5	0-100	—
Chloroethane (wt %)	—	0-10	—
1,1,2,2-tetrachloroethane (wt %)	5-25	—	—
Trichloroethylene (wt %)	0-2	0-5	—
1,1,1-trichloroethane (wt%)	0-5	—	—
1,1,2-trichloroethane (wt %)	0-90	—	5-30
1,1-dichloroethane (wt %)	—	0-30	—
1,2-dichloroethane (wt %)	10-100	0-100	10-50
Chloroprene (wt %)	—	0-15	—
Tetrachloroethylene (wt %)	0-15	—	5-25
Chlorobenzene (wt%)	0-5	—	—
1,2-dichloroethylene (wt %)	—	0-20	—
2-Chloroethanol (wt %)	0-2	—	—
Ethylene (wt %)	—	0-3	—
Bis(2-chlorethyl)ether (wt%)	0-30	—	1-5
Heavier Compounds ^b (wt %)	30-60	—	25-50
<i>Metals</i>			
Arsenic (ppm)	2	2	2
Cadmium (ppm)	5	5	1
Chromium (ppm)	11.3	1	1
Lead (ppm)	20	5	5.3
Mercury (ppm)	0.2	0.1	0.1
Selenium (ppm)	5	5	1
Iron (ppm)	200-2000	—	—
<i>Parameters</i>			
Ash Content (ppm)	0-1200	0-750	0-750
Higher Heating Value (Btu/lb)	5,000-6,200	5,000-6,500	5,000-6,200
Chlorine (wt%)	65-90	65-90	65-90
Average Production Rate (lb/hr)	6,400	1000	140
Density (lb/gal)	10-12	10-11	10-11

NOTES:

^a Analyses from Trial Burn Results, Comprehensive Performance Test Report, Occidental Chemical, Ingleside, Texas, Revision 0 , July 25, 2003

^b Primarily chlorinated butanes and butanes.

TABLE 2-4

Mother Liquor Waste ^a
 OxyChem
 Ingleside, Texas

<i>Components</i>	<i>Concentrations Ranges/Features</i>
<u>Composition:</u>	
1,2-Dichloroethane (wt%)	40-60
Trichloroethane	4,000 mg/Kg
Hexachlorobenzene	1,100 mg/Kg
Arsenic (ppm)	--
Cadmium (ppm)	4
Chromium (ppm)	10
Lead (ppm)	--
Mercury (ppm)	--
Selenium (ppm)	--
Heavier Compounds ^b (wt%)	30-60
Iron (ppm)	30,000-50,000
Chlorine (wt%)	65-75
<u>Parameters:</u>	
Physical Description	Liquid
Ash Content (ppm)	9,600-100,000
Higher Heating Value (BTU/lb)	5,000-6,000
Density (lb/gal)	11-12
Specific Gravity (unitless)	1.365

NOTE:

^a Analyses from Trial Burn Results, Comprehensive Performance Test Report, Occidental Chemical, Ingleside, Texas, Revision 0 , July 25, 2003 and annual sampling on 12/1/04.

^b Primarily chlorinated butanes and butenes.

TABLE 2-5

Hazardous Waste Oil^a
 OxyChem
 Ingleside, Texas

<i>Components</i>	<i>Concentrations Ranges/Features</i>
<u>Composition:</u>	
Oil (wt%)	>95
1,1,1-trichloroethane (wt%)	0-5
1,2 -dichloroethane (wt%)	0-5
Arsenic (ppm)	--
Cadmium (ppm)	--
Chromium (ppm)	--
Lead (ppm)	--
Mercury (ppm)	--
Selenium (ppm)	--
Chlorine (wt%)	<1
Zinc (ppm)	<1
Parameters	
Physical Description	Liquid
Ash Content (ppm)	4,000-30,000
Higher Heating Value (BTU/lb)	10,000-20,000
Density (lb/gal)	7.2-7.6

NOTE:

^a Analyses from Trial Burn Results, Occidental Chemical, Ingleside, Texas, Revision, June 7, 2002.

**Existing Waste Concentration Data
For Proposed Delisting Streams**

Notes: All other Appendix IX volatiles, semivolatiles and PCBs were less than detection limits. DRAS run using 508,730 $\text{cy}/\text{yr} \times 20$ years, 10^{-6} s Risk and HI 0.1.

Constituent	EPA Delisting	Rockbox Clarifier	Effluent Levels (mg/L)	Volatile Organics
Bromoform	0.026	0.481	0.008	Bromodichloromethane
Antimony	0.03	0.0816	0.0719	Bromodichloromethane
Arsenic	0.245	0.385	1.34	Boron
Boron	0.01	0.166	<0.01	Beryllium
Chromium	0.01	0.0225	<0.01	Cadmium
Copper	0.08	418	<0.01	Lead
Manganese	0.002	0.00323	<0.002	Mercury
Nickel	0.19	1.13	0.002	Nickel
Selenium	0.06	0.0863	<0.01	Silver
Thallium	0.005	0.154	<0.01	Thallium
Tin	—	0.838	0.01	Tin
Zinc	11.2	0.11	0.13	Zinc
<i>Dioxins/Furans</i>				
2,3,7,8 TCDD Equivalent	1.82E-08	9.26E-05	<0.02	Oil and Grease
<i>Other Analytes</i>				
Ph	8.1	NA	NA	Phenol
Cyanide	<6	NA	NA	Cyanide
Sulfide	70	NA	NA	Sulfide

TABLE 2-7

TABLE 2-8
Maximum Concentration of Constituents Detected
March 2006
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas

Constituent	Wastewater Treatment Biosludge Total Conc. (mg/Kg)	Wastewater Treatment Biosludge TCLP Conc. (mg/L)	EPA Delisting Level (mg/Kg)	EPA Delisting Level (mg/L)
			TOTAL	TCLP
<u>Volatile Organics</u>				
Methylene Chloride	0.009	0.044	101	8.39
Benzoic Acid	0.32	0.108	5.00E+08	559
Acetone	3.34	0.67	1.25E+07	14.8
Methyl Ethyl Ketone	0.20	0.028	1,310	88.6
Vinyl Acetate	0.008	<0.005	150	140
1,3-Dichloropropene	<0.008	0.0038	64.2	0.272
Chloroform	22.0	<0.005	8.66E+05	4.46
1,2-Dichloroethane	0.015	<0.005	8.62	0.0103
Trichloroethylene	0.005	<0.005	187	0.886
<u>Metals</u>				
Arsenic	9.7	0.006	26,200	0.0194
Barium	33.1	2.12	9.23E+05	15.1
Beryllium	1.6	<0.02	36,900	1.62
Chromium	22	0.008	8.66E+05	44,900
Cobalt	1.0	0.768	7.49E+06	--
Copper	91	0.43	5.00E+06	2,180
Iron	1,160	1.0	3.75E+07	--
Lead	4.0	<0.5	4.43E+05	--
Magnesium	<500	3.2	--	--
Manganese	222	1.70	92,300	--
Mercury	0.032	<0.002	0.153	0.0579
Nickel	71	0.34	2.04E+05	5.85
Thallium	<0.05	0.852	1.79E+02	0.0273
Vanadium	24.3	<0.05	8.74E+05	4.37
Zinc	92.8	2.14	1.44E+06	58
<u>Dioxins/Furans</u>				
2,3,7,8 TCDD Equivalent	1.23E-03	1.21E-08	7.37E-01	1.81E-07
<u>Semi-Volatile Analyses</u>				
Bis(2-ethylhexyl)phthalate	0.23	<0.01	4031E+05	2.95
Hexachlorobenzene	0.18	<0.01	42.9	0.0170

Notes: All other Appendix IX volatiles, semivolatiles and PCBs were less than detection limits.

DRAS run using 3,689 cy x 20 years, 10^{-05} Risk and HI 0.1

Bold numbers exceed delisting level. Possible lab error.

Volume of Waste Generated (Monthly and Annually)

Table D-1
Rockbox Clarifier Effluent Generation 2001-2005
OxyChem
Ingleside, Texas

Date: (Units):	2001 (Gallons)	2002 (Gallons)	2003 (Gallons)	2004 (Gallons)	2005 (Gallons)
January	4,766,978	4,617,006	7,305,265	7,320,203	5,152,464
February	4,022,030	4,637,378	5,976,085	5,989,385	5,103,027
March	5,389,358	5,974,184	6,654,585	5,411,587	5,763,886
April	6,622,213	8,769,411	7,094,495	5,020,976	5,533,250
May	6,991,414	7,358,159	6,626,474	5,735,852	5,859,230
June	7,665,083	7,484,725	6,390,385	6,344,004	5,575,923
July	6,311,060	8,313,514	5,832,928	5,584,647	6,637,403
August	5,996,426	7,912,400	5,752,685	6,698,223	5,978,975
September	5,331,600	6,270,507	6,147,380	5,938,129	7,146,631
Ocotber	4,631,824	7,466,818	7,063,767	5,405,638	6,305,902
November	3,945,244	3,318,826	5,935,962	6,659,986	5,444,977
December	<u>4,326,475</u>	<u>6,880,339</u>	<u>6,944,571</u>	<u>5,455,088</u>	<u>6,372,426</u>
Total	65,999,705	79,003,266	77,724,582	71,563,719	70,874,097
Avg. (gal)	5,499,975	6,583,606	6,477,048	5,963,643	5,906,925
Max (gal)	7,665,083	8,769,411	7,305,265	7,320,203	7,146,631

Notes:

Average monthly flow = 6,086,239 gallons/month

Average annual flow = 73,033,074 gallons/year

Maximum monthly flow = 8,769,411 gallons/month

Max annual flow = 79,033,266 gallons/year or or 391,331 cy/year

Max annual flow X 30% = 508,730 cy/year

Table D-2
Wastewater Treatment Biosludge Waste Generation 2001-2005
OxyChem
Ingleside, Texas

Date: Units:	lbs	cuyds	lbs	cuyds	lbs	cuyds	lbs	cuyds	lbs	cuyds
	2001	2001	2002	2002	2003	2003	2004	2004	2005	2005
January	398,520	199	439,420	220	524,320	262	89,260	45	143,660	72
February	483,040	242	358,620	179	582,560	291	89,580	45	330,860	165
March	146,580	73	452,780	226	478,700	239	139,180	70	648,920	324
April	655,300	328	710,700	355	630,560	315	95,680	48	414,180	207
May	496,600	248	710,080	355	443,720	222	385,640	193	272,280	136
June	311,260	156	556,440	278	481,660	241	739,360	370	225,780	113
July	398,740	199	352,680	176	312,820	156	409,360	205	332,680	166
August	411,440	206	227,360	114	556,720	278	237,280	119	439,980	220
September	201,660	101	426,700	213	875,880	438	470,760	235	283,900	142
October	746,098	373	480,780	240	66,060	33	367,760	184	384,240	192
November	428,840	214	716,360	358	312,600	156	416,360	208	400,120	200
December	<u>537,160</u>	<u>269</u>	<u>243,220</u>	<u>122</u>	<u>252,280</u>	<u>126</u>	<u>359,220</u>	<u>180</u>	<u>187,200</u>	<u>94</u>
Total	5,215,238	2,608	5,675,140	2,838	5,517,880	2,759	3,799,440	1,900	4,063,800	2,032

5 year annual average = 2427 cy
 5 year annual max = 2838 cy
 30% increase on annual max = 3689 cy
 20 years at 30% annual max = 73780 cy

Proposed Analytical Suite

Proposed number of samples:

sludge: 4 and 1 duplicate

effluent: 3 and 1 duplicate (use 2/2003 data)

Table 3-2

Target Compounds for Waste Characterization – *Limestone Clarifier Effluent*
 OxyChem
 Ingleside, Texas

Constituents	EPA Method (a)
<u>Appendix IX Analyses</u>	
• Volatiles	8260A
• Semivolatiles	8270B
• Metals (b)	· 7470 mercury · 6020 all others
• Herbicides (chlorinated) (one sample only)	8151
• Pesticides (chlorinated and organophosphorus) (one sample only)	8081 and 8141
• PCBs (one sample only)	8082
• Dioxins/Furans	1613

Hazardous Waste Characteristics/Other

<i>Toxicity Characteristic</i>	various
<i>Ignitability</i>	1010/1020
<i>pH</i>	9045
<i>Total Cyanide</i>	9010
<i>Total Sulfide</i>	9030A
<i>Total Oil and Grease</i>	1664

NOTES:

- (a) Test Methods for Evaluating Solid Waste-Physical and Chemical Methods, EPA SW-846
- (b) Metals will be run on one sample with pH adjustments to pH3, pH5 and pH10 (see **Appendix E** Multiple pH Test Protocol)

Table 3-3

Target Compounds for Waste Characterization – *Wastewater Treatment Biosludge*
(Total and TCLP Basis)
 OxyChem
 Ingleside, Texas

Parameter	EPA Method (a)	Total Basis	TCLP Basis
<u>Appendix IX Constituents</u>			
Appendix IX Volatiles	8260A	X	X
Appendix IX Semivolatiles	8270B	X	X
Appendix IX Metals /Mercury	6020/7470	X	X
Appendix IX Organophosphorus Pest. (one sample only)	8081	X	X
Appendix IX Organochlorine Pest. (one sample only)	8141	X	X
Appendix IX Herbicides (chlorinated) (one sample only)	8151A	X	X
Appendix IX PCBs (one sample only)	8082	X	X
Appendix IX Dioxins/Furans	1613B	X	X
<u>Hazardous Waste Characteristics/Other</u>			
Total Cyanide	9010	X	
Total Sulfide	9030A	X	
pH	9045	X	
Ignitability	1030	X	
Total Oil and Grease	1664	X	
Total Petroleum Hydrocarbons	1005	X	
Percent Moisture	160.3	X	
Toxicity Characteristic Leaching Procedure	1311		X
TCLP Extraction for metals at pH 3, 5, 10 (b)	6020/7470		X

Notes:

- (a) Test Methods for Evaluating Solid Waste-Physical and Chemical Methods, EPA SW-846; and Methods of Analysis of Water and Waste, EPA-600/4-79-020.

See Appendix E “Multiple pH Test Protocol”

4.3 SAMPLING PROCEDURES

Limestone Clarifier Effluent

A composite sample of the Limestone Clarifier Effluent will be collected over a 5-day period for four weeks. The composite each week will be made up of a grab samples collected from the $\frac{3}{4}$ -inch sample line located on the outlet piping from the pump tank . One grab samples will be collected each day for five days as follows:

1. Place an empty 3-gallon (minimum) clean glass jar in the laboratory refrigerator.
2. Label the jar *Limestone Clarifier Effluent* along with the start date of sample collection.
3. Keep the jar capped except when adding the grab samples..
4. Purge the sampling valve into the chemical sewer. Fill a minimum of two 1-liter glass sample bottles with sample and take them immediately to the refrigerated glass jar. Also fill two vials for volatile organic analysis (VOA) and label them with sample I.D., date and time of sampling and return them to the laboratory refrigerator. Pour the grab sample into the 3-gallon cooled jar.
5. Retain about 50 mL of grab sample and measure the pH of the sample in the OxyChem laboratory.
6. Repeat these procedures for five consecutive days, collecting the grab at the same time each day or at varying times to include more variability.
7. Record on the sampling form (**Figure 4-1**) the time and date of each grab sample and the sample pH.
8. At the end of the 5-day sampling period, pour the composite sample into the laboratory-supplied sample containers. Add the sample name: *Limestone Clarifier Effluent – WEEK 1, WEEK 2, etc.*, and date and time the sample was composited.
9. The grab samples for VOAs (five sets) will be sent to the lab for compositing using the method described in **Appendix F**.
10. Pack the samples into a cooler with ice and contact the laboratory for pickup.
11. Decontaminate the 3-gallon jar using phosphate free laboratory-grade detergent and deionized water and repeat Steps 1-10 for Weeks 2,3, and 4.

Wastewater Treatment Sludge

1. Collect sludge directly from the rolloff boxes off the belt press.
2. Divide the rolloff boxes into an imaginary 8 sections of equal area.
3. Use a stainless steel core sampler to remove sludge from the center of each of the eight sections.

4. Fill the sample container for the VOA analyses from the first core sampled.
5. Composite samples from the remainder of core 1 with the remaining 7 cores.
6. Composite in a stainless steel bowl using a stainless steel spoon. Decontaminate the spoon, bowl and core samplers after the sample bottles are filled.
7. Fill all sample bottles (except VOAs) with the composite sample and complete the sample label on each containers (include date/time of compositing and sampler initials). Add the sample I.D. *Wastewater Treatment Biosludge – WEEK 1, WEEK 2, etc.*
8. Pack the samples into a cooler with ice and contact the laboratory for pickup.
9. Decontaminate the core sampler, stainless steel bowl and spoon using phosphate free laboratory-grade detergent and deionized water.
10. Repeat Steps 1-9 for Weeks 2,3, and 4.

QA/QC Samples

- On Week 1 samples only, collect one field blank at the Limestone Clarifier Effluent sample location. Collect the field blank by filling a clean VOA vial with deionized water near the sample port. Request only Appendix IX volatile analyses for the field blank.
- On the Week 1 sample only, pour the combined *Limestone Clarifier Effluent* sample into three separate bottles for metals analysis. The bottles should contain no preservative, and the sampler will request that the pH of the samples be adjusted in the lab to pH 3, pH 5 and pH 10. This can be requested on the chain-of-custody form.
- On the Week 1 sample only, for the *Wastewater Treatment Biosludge* request that the TCLP leachate used to extract the sludge for metals be adjusted in the lab to pH 3, pH 5 and pH 10. This can be requested on the chain-of-custody form.
- On Weeks 2 and 4 only, carry trip blanks for analysis of Appendix IX Volatile organics.
- On the Week 3 samples only, collect a duplicate composite sample of the *Limestone Clarifier Effluent* by collecting twice the grab sample volume (four liters instead of two) once a day for five days. Collect duplicate sets of VOA samples each day. Duplicate analyses will be run on volatiles, semivolatiles, dioxin/furans oil and grease and characteristic analyses (sulfide, cyanide, pH).

- On the Week 3 samples only, collect a duplicate composite sample of the *Wastewater Treatment Biosludge* by collecting two core samples from each of the 8 grid areas and dividing the composite sample among two sets of sample containers. Carefully fill the VOA and duplicate VOA containers as described in step 4 of the Biosludge sampling procedures. Duplicate analyses will be run on volatiles, semivolatiles, dioxin/furans and oil and grease and characteristic analyses (sulfide, cyanide).

On the label and chain-of-custody, the sample date and sample time will be the date and time the sample is composited. Grab samples for VOA analyses will be recorded separately on the chain-of-custody form with the grab sample date and time shown. A separate chain-of-custody form will be completed for the wastewater and biosludge samples.

Quality Assurance Quality Control Samples

Proposed QA/QC Samples
OxyChem
Ingleside, Texas

<i>QA/QC Sample</i>	<i>Week</i>	<i>Limestone Clarifier Effluent</i>	<i>Wastewater Treatment Biosludge</i>
<u>Field Samples:</u>			
Field Blank	Week 1	X	
Multiple pH	Week 1	X	X
Trip Blank	Weeks 2 and 4	X	X
Duplicate	Week 3	X	X
<u>Laboratory Samples:</u>			
Duplicates	Weeks 1-4	X	X
Spikes	Weeks 1-4	X	X
Surrogate Spikes	Weeks 1-4	X	X
Method Blanks	Weeks 1-4	X	X



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Health Environmental Safety Department

July 18, 2007

Ms. Michelle Peace
Delisting Section
Corrective Action and Waste Minimization Section, 6PD-C
United States Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202

Re: **Submittal of Interim Results for Delisting
Wastewater Treatment Biosludge
Occidental Chemical Corporation – Ingleside, Texas Plant
EPA I.D. TXD982286932**

Dear Ms. Peace:

As you are aware, Occidental Chemical Corporation is in the process of delisting our wastewater treatment biosludge. Our sampling plan for the delisting effort was approved by EPA Region 6 in October 2006. We have recently completed our four rounds of sludge sampling and obtained the necessary data to delist. We have analyzed our data using the DRAS 2.0 model. The data on a total and TCLP basis pass the DRAS 2.0 limits. The following brief letter report presents this effort. We request that we be allowed to proceed with our delisting using DRAS 2.0.

Sampling Procedures

Sampling was conducted in accordance with the Sampling and Analysis Plan dated October 23, 2006. All sampling occurred in April and May 2007. To simulate the worst case conditions, flows from the Rockbox Effluent system were diverted to the Wastewater Biotreatment System (as shown in Figure 1-2 of the Sampling and Analysis Plan). Sludge was collected from the belt filter press once every two hours until a complete roll off box was filled. The VOA samples were collected as grab samples from the first scoop of sludge while the remaining samples were taken from a composite of all the scoops. Samples were kept cold and sent by overnight courier to the laboratories following standard chain-of-custody procedures.

Analyses

Samples were analyzed for RCRA characteristics on a total basis. They were then analyzed for the Appendix IX analyses on a total and TCLP basis. All analyses were performed by e-Labs with the exception of dioxins/furans which were analyzed by STL-Knoxville. The results of the analyses are shown in Tables 1 and 2 of Attachment 1.

Data Evaluation

The samples were evaluated to determine what constituents were detected on a total and TCLP basis, and the maximum concentrations detected. These values are shown in Tables 1 and 2. As

shown, the primary constituents in the sludge are volatile organics and metals. Only a few semi-volatiles were detected and none of the pesticides, herbicides, or PCBs was detected (except Silvex at a very low concentration).

The dioxin and furan data were converted to 2,3,7,8-TCDD equivalent using toxicity equivalent factors. The calculations for the samples are in Attachment 2. The factors presented by the World Health Organization (WHO) in 1998 are those currently accepted by EPA and these were included in the calculations. If a congener was not detected, then one-half the detection limit was used in the calculation.

The maximum concentration for total and TCLP data were entered into DRAS 2.0 to determine delisting levels. The program was run using a maximum annual sludge volume of 3,689 cubic yards generated and disposed of for 20 years. The risk factor used was 10^{-5} and the Hazard Quotient was 1.0. The DRAS output files are included in Attachment 3. Tables 3 and 4 show the maximum concentration of each constituent detected in the four samples along with the DRAS 2.0 delisting levels. All of the constituents detected passed the DRAS delisting levels.

For arsenic, the maximum concentration in the leachate (0.0265 mg/L) did not pass the drinking water ingestion pathway limit (0.0194 mg/L), but it did pass the DRAS limit based on MCL (1.99 mg/L). For 2,3,7,8-TCDD, the maximum concentration in the sample leachate (5.92E-08 mg/L) did not pass the most stringent DRAS limit (4.23E-09 mg/L for dermal exposure pathway), but it did pass the drinking water ingestion pathway (1.81E-07 mg/L) primarily used for delisting purposes.

Based on this evaluation, we feel that our waste stream remains a very good candidate for delisting and request that we are allowed to proceed with our delisting using DRAS 2.0. We propose that we submit the formal petition to EPA by September 1, 2007. If you have any questions regarding this submittal, please feel free to contact me at (361) 776-6160.

Sincerely,



Michael Maldonado
Environmental Superintendent

Attachment 1
Tables

Delisting Samples Collected April – May 2007

TABLE 1

**Maximum Concentration of Constituents Detected
April 11, 2007 through May 22, 2007 (WEEKS 1-4) TOTAL BASIS
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas**

Constituent	WEEK 1 April 11, 2007 (mg/Kg)	WEEK 2 April 25, 2007 (mg/Kg)	WEEK 3 May 14, 2007 (mg/Kg)	WEEK 3 Dup May 14, 2007 (mg/Kg)	WEEK 4 May 22, 2007 (mg/Kg)	Maximum Concentration (mg/Kg)
<i>Volatile Organics</i>						
Methylene Chloride	<0.010	0.0039 (J)	0.0058 (J)	0.0049 (J)	0.0039 (J)	0.0058 (J)
Acetone	0.010 (J)	0.0051 (J)	0.069	0.060	<0.020	0.069
Trichloroethylene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Trichloroethane	<0.005	<0.005	0.0018 (J)	0.0016(J)	0.0007 (J)	0.0018 (J)
Ethylbenzene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Xylene	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
<i>Metals</i>						
Antimony	<0.472	0.349 (J)	0.178 (J)	na	<0.439	0.349 (J)
Arsenic	3.09	3.37	3.62	na	2.78	3.62
Barium	25.8	25.2	27.7	na	24.1	27.7
Beryllium	0.0623 (J)	0.0523 (J)	0.0437 (J)	na	0.0358 (J)	0.0623 (J)
Cadmium	0.0992 (J)	0.116 (J)	0.124 (J)	na	0.115 (J)	0.124 (J)
Chromium	9.15	9.63	10.4	na	7.81	10.4
Cobalt	0.533	0.611	0.787	na	0.568	0.787
Copper	39.1	34.1	44.1	na	37.1	44.1
Lead	2.51	2.56	2.70	na	2.29	2.70

Notes: All other Appendix IX volatiles, semivolatiles and PCBs were less than detection limits.

TABLE 1

Maximum Concentration of Constituents Detected
April 11, 2007 through May 22, 2007 (WEEKS 1-4) **TOTAL BASIS**
Wastewater Treatment Biosludge

Constituent	WEEK 1 April 11, 2007 (mg/Kg)	WEEK 2 April 25, 2007 (mg/Kg)	WEEK 3 May 14, 2007 (mg/Kg)	WEEK 3 Dup May 14, 2007 (mg/Kg)	WEEK 4 May 22, 2007 (mg/Kg)	Maximum Concentration (mg/Kg)
<i>Metals (continued)</i>						
Mercury	0.00342 (J)	0.00287 (J)	0.00813 (J)	na	0.00283 (J)	0.00813 (J)
Nickel	24.2	20.4	25.1	na	20.3	25.1
Selenium	0.622	0.633	0.501	na	0.574	0.633
Silver	0.0348 (J)	0.0344 (J)	0.0981 (J)	na	0.0409 (J)	0.0981 (J)
Thallium	<0.472	0.0908 (J)	<0.463	na	0.0962 (J)	0.0962 (J)
Tin	1.45 (J)	1.59 (J)	1.53 (J)	na	1.47 (J)	1.59 (J)
Vanadium	5.49	6.62	6.27	na	4.69	6.62
Zinc	43.8	39.0	44.1	na	36.7	44.1
<i>Dioxins/Furans</i>						
2,3,7,8 TCDD Equivalent	5.21E-05	2.25E-05	6.03E-05	na	3.86E-04	3.86E-04
<i>Semi-Volatile Analytes</i>						
Bis(2-ethylhexyl)phthalate	<0.170	<0.170	<0.170	<0.170	<0.170	<0.170
Benzoic Acid	<0.170	<0.170	<0.170	<0.170	<0.170	<0.170
Naphthalene	<0.0066	<0.0066	<0.0066	<0.0066	<0.0066	<0.0066
Phenanthrene	<0.0066	<0.0066	<0.0066	<0.0066	<0.0066	<0.0066
<i>Pesticides/Herbicides</i>						
Silvex (2,4,5-TP)	0.011	na	na	na	na	0.011
PCBs	<0.017	na	na	na	na	na
All Aroclors						

Notes: All other Appendix IX volatiles, semivolatiles and PCBs were less than detection limits.

TABLE 2

**Maximum Concentration of Constituents Detected
April 11, 2007 through May 22, 2007 (WEEKS 1-4) TCLP BASIS**
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas

Constituent	WEEK 1 April 11, 2007 (mg/L)	WEEK 1 (metals) (mg/L)	WEEK 1 April 25, 2007 (mg/L)	WEEK 2 May 14, 2007 (mg/L)	WEEK 3 May 22, 2007 (mg/L)	WEEK 4 May 22, 2007 (mg/L)	Maximum Concentration (mg/L)
<i>Volatile Organics</i>							
Methylene Chloride	0.020 (J)		0.035	0.016 (J)	0.0097 (J)	0.0097 (J)	0.035
Acetone	0.033		0.070	0.140	0.170	0.170	0.170
Toluene	0.0014 (J)		0.012	0.0029 (J)	0.0039 (J)	0.0039 (J)	0.012
Ethyl benzene	<0.010		0.008 (J)	<0.010	0.0019 (J)	0.0019 (J)	0.008 (J)
o, m,p xylene	<0.030		0.048	0.0021 (J)	0.013 (J)	0.013 (J)	0.048
Trichloroethylene	<0.010		<0.010	0.001 (J)	<0.010	0.001 (J)	0.001 (J)
Trichloroethane	<0.010		<0.010	<0.001	<0.010	<0.010	<0.001
<i>Metals</i>							
pH 3	<0.0100	0.00263	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Antimony	0.0224	0.0150	0.00756 (J)	0.0265	0.0237	0.0198	0.00263
Arsenic	0.204	0.0769	0.0330	0.187	0.192	0.179	0.0265
Barium	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.204
Beryllium							<0.0100
Cadmium	0.000563 (J)	<0.0100	0.000535 (J)	0.000496 (J)	0.000562 (J)	0.000616 (J)	0.000616 (J)
Chromium	0.000677 (J)	0.00623 (J)	0.0304	0.00307 (J)	0.00373 (J)	0.00336 (J)	0.0304
Cobalt	0.000655 (J)	0.00282 (J)	0.000883 (J)	0.00545 (J)	0.00744 (J)	0.00563 (J)	0.00744 (J)
Copper	0.239	0.151	0.0170	0.206	0.212	0.274	0.274

Notes: All other Appendix IX volatiles, semivolatiles and PCBs were less than detection limits.

TABLE 2

**Maximum Concentration of Constituents Detected
April 11, 2007 through May 22, 2007 (WEEKS 1-4) TCLP BASIS
Wastewater Treatment Biosludge**

Constituent	WEEK 1 April 11, 2007 (mg/L)	WEEK 1 (metals) (mg/L)	WEEK 1 (metals) (mg/L)	WEEK 2 April 25, 2007 (mg/L)	WEEK 3 May 14, 2007 (mg/L)	WEEK 4 May 22, 2007 (mg/L)	Maximum Concentration (mg/L)
<i>Metals (continued)</i>							
Lead	pH 3 0.000806 (J) <0.0002	pH 5 <0.0100 <0.0002	pH 10 0.00110 (J) <0.0002	0.000718 (J) 0.00005 (J)	0.00220 (J) <0.0002	0.000419 (J) <0.0002	0.00220 (J) 0.00005 (J)
Mercury	0.276	0.154	0.0472	0.230	0.290	0.233	0.290
Nickel	0.00429 (J) <0.0100	<0.0100 <0.0100	<0.0100 <0.0100	0.00384 (J) 0.00105 (J)	0.00770 (J) 0.00203 (J)	0.00577 (J) <0.0100	0.00770 (J) <0.0100
Selenium	<0.0100 <0.0100	<0.0100 <0.0100	<0.0100 <0.0100	<0.0100 <0.0100	<0.0100 <0.0100	0.00168 (J) <0.0100	0.00203 (J) <0.0100
Silver	<0.0100 <0.0100	<0.0100 <0.0100	<0.0100 <0.0100	<0.0100 <0.0100	<0.0100 <0.0100	0.00468 (J) 0.00262 (J)	0.00586 (J) 0.240
Thallium	<0.0100 <0.0100	<0.0100 <0.0100	<0.0100 <0.0100	<0.0100 <0.0100	<0.0100 0.161	0.162	0.240
Tin	0.000357 (J) 0.240	0.00215 (J) 0.0427	0.00288	0.0288	0.202		
Vanadium							
Zinc							
<i>Dioxins/Furans</i>							
2,3,7,8 TCDD Equivalent	5.92E-08	na	na	5.79E-08	2.85E-08	2.80E-08	5.92E-08
<i>Semi-Volatile Analyses</i>							
Benzoic Acid	0.0033 (J)	0.0045 (J)	0.0095	0.007			0.0095
Bis(2-ethylhexyl)phthalate	0.0015 (J)	<0.005	0.0024 (J)	<0.005			0.0024 (J)
Naphthalene	<0.0002	0.00033	<0.0002	0.00066			0.00066
Phenanthrene	<0.0002	<0.0002	<0.0002	0.00028			0.00028
<i>Pesticides/Herbicides</i>							
Silvex (2,4,5-TP)	<0.0001	na	na	na	na	na	na
PCBs							
All Aroclors	<0.0005	na	na	na	na	na	na

Notes: All other Appendix IX volatiles, semivolatiles and PCBs were less than detection limits.

TABLE 3

Maximum Concentration and DRAS 2.0 Limits
 April 11, 2007 through May 22, 2007 (WEEKS 1-4) **TOTAL BASIS**
 Wastewater Treatment Biosludge

Constituent	Maximum Concentration (mg/Kg)	DRAS 2.0 Limit (mg/Kg)
<u>Volatile Organics</u>		
Methylene Chloride	0.0058 (J)	101
Acetone	0.069	1.25E+08
Trichloroethylene	<0.005	1.87E+02
Trichloroethane	0.0018 (J)	1.54E+03
Ethylbenzene	<0.005	2.61E+04
Toluene	<0.005	1.00E+08
Xylenes (total)	<0.015	8.37E+08
<u>Metals</u>		
Antimony	0.349 (J)	3.14E+05
Arsenic	3.62	2.62E+04
Barium	27.7	9.23E+06
Beryllium	0.0623 (J)	1.43E+05
Cadmium	0.124 (J)	6.28E+04
Chromium	10.4	8.66E+06
Cobalt	0.787	7.49E+07
Copper	44.1	5.00E+07
Lead	2.70	4.43E+05
Mercury	0.00813 (J)	1.53
Nickel	25.1	2.04E+06
Selenium	0.633	1.22E+06
Silver	0.0981 (J)	7.70E+05
Thallium	0.0962 (J)	1.79E+03
Tin	1.59 (J)	7.49E+08
Vanadium	6.62	8.74E+06
Zinc	44.1	1.44E+07
<u>Dioxins/Furans</u>		
2,3,7,8 TCDD Equivalent	3.86E-04	7.37E-01
<u>Semi-Volatile Analyses</u>		
Bis(2-ethylhexyl)phthalate	<0.170	4.31E+05
Benzoic Acid	<0.170	5.00E+09
Naphthalene	<0.0066	3.11E+04
Phenanthrene	<0.0066	--
<u>Pesticides/Herbicides</u>		
Silvex (2,4,5-TP)	0.011	1.93E+06

Notes:

All other Appendix IX volatiles, semivolatiles and PCBs were less than detection limits.

DRAS Version 2.0 run using 3,689 cy x 20 years, 10^{-05} Risk and HI 1.0. Some Delisting Levels exceed saturation concentrations (not corrected).

TABLE 4

Maximum Concentration and DRAS 2.0 Limits
 April 11, 2007 through May 22, 2007 (WEEKS 1-4) **TCLP BASIS**
 Wastewater Treatment Biosludge

Constituent	Maximum Concentration (mg/L)	DRAS 2.0 Limit (mg/L)
<u>Volatile Organics</u>		
Methylene Chloride	0.035	0.186
Acetone	0.170	148
Trichloroethylene	0.012	0.197
Trichloroethane	0.008 (J)	7.86
Ethylbenzene	0.048	27.5
Toluene	0.001 (J)	39.3
Xylenes (total)	<0.001	393
<u>Metals</u>		
Antimony	0.00263	0.426
Arsenic	0.0265	1.99 (a)
Barium	0.204	115
Beryllium	<0.0100	0.861
Cadmium	0.000616 (J)	0.310
Chromium	0.0304	797
Cobalt	0.00744 (J)	--
Copper	0.274	1.88E+04
Lead	0.00220 (J)	155
Mercury	0.00005 (J)	0.168
Nickel	0.290	58.5
Selenium	0.00770 (J)	1.2
Silver	<0.0100	7.94
Thallium	0.00203 (J)	0.182
Tin	<0.0100	--
Vanadium	0.00586 (J)	43.7
Zinc	0.240	580
<u>Dioxins/Furans</u>		
2,3,7,8 TCDD Equivalent	5.92E-08	1.81E-07 (b)
<u>Semi-Volatile Analyses</u>		
Bis(2-ethylhexyl)phthalate	0.0095	0.236
Benzoic Acid	0.0024 (J)	5590
Naphthalene	0.00066	2.68
Phenanthrene	0.00028	--
<u>Pesticides/Herbicides</u>		
Silvex (2,4,5-TP)	<0.0001	1.97

Notes:

All other Appendix IX volatiles, semivolatiles and PCBs were less than detection limits.

DRAS Version 2.0 run using 3,689 cy x 20 years, 10^{-05} Risk and HI 1.0. Some Delisting Levels exceed saturation concentrations (not corrected).

- (a) Using the MCL calculated maximum limit. Groundwater ingestion limit is 0.0194 mg/L
- (b) Using the drinking water ingestion pathway

Attachment 2
2,3,7,8-TCDD Equivalent Calculations

Delisting Samples Collected April – May 2007

Attachment 2-1
Calculation of 2,3,7,8-TCDD Equivalent
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas

Sample I.D.	Date Collected	Analyte	Conc. (mg/Kg) (a)	TEF (b)	TEQ Conc. (mg/Kg) (c)
WEEK 1					
	04/11/2007	2,3,7,8-TCDD	5.00E-07	1	5.00E-07 *
		1,2,3,7,8-PeCDD	6.71E-07	1	6.71E-07
		1,2,3,4,7,8-HxCDD	4.16E-06	0.1	4.16E-07
		1,2,3,6,7,8-HxCDD	4.72E-06	0.1	4.72E-07
		1,2,3,7,8,9-HxCDD	7.04E-06	0.1	7.04E-07
		1,2,3,4,6,7,8-HpCDD	1.16E-04	0.01	1.16E-06
		Octachlorodibenzo-p-dioxins	6.28E-04	0.0001	6.28E-08
		2,3,7,8-TCDF	3.29E-05	0.1	3.29E-06
		1,2,3,7,8-PeCDF	5.17E-06	0.05	2.59E-07
		2,3,4,7,8-PeCDF	6.79E-06	0.5	3.40E-06
		1,2,3,4,7,8-HxCDF	1.23E-04	0.1	1.23E-05
		1,2,3,6,7,8-HxCDF	7.22E-05	0.1	7.22E-06
		2,3,4,6,7,8-HxCDF	4.28E-05	0.1	4.28E-06
		1,2,3,7,8,9-HxCDF	1.00E-05	0.1	1.00E-06
		1,2,3,4,6,7,8-HpCDF	1.35E-03	0.01	1.35E-05
		1,2,3,4,7,8,9-HpCDF	2.53E-04	0.01	2.53E-06
		Octachlorodibenzofurans	3.08E-03	0.0001	3.08E-07

2,3,7,8-TCDD Equivalent **5.21E-05**

- (a) Laboratory results are reported in pg/g=E-12 g/g or E-06 mg/Kg.
- (b) Toxicity Equivalency Factors from World Health Organization (WHO), 1998
- (c) TEQ = Toxicity Equivalent
- * Compound not detected so one half detection limit was entered.

Attachment 2-2
Calculation of 2,3,7,8-TCDD Equivalent
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas

Sample I.D.	Date Collected	Analyte	Conc. (mg/L) (a)	TEF (b)	TEQ Conc. (mg/L) (c)
WEEK 1					
	04/11/2007	2,3,7,8-TCDD	4.95E-09	1	4.95E-09 *
		1,2,3,7,8-PeCDD	2.48E-08	1	2.48E-08 *
		1,2,3,4,7,8-HxCDD	2.48E-08	0.1	2.48E-09 *
		1,2,3,6,7,8-HxCDD	2.48E-08	0.1	2.48E-09 *
		1,2,3,7,8,9-HxCDD	2.48E-08	0.1	2.48E-09 *
		1,2,3,4,6,7,8-HpCDD	1.17E-08	0.01	1.17E-10
		Octachlorodibenzo-p-dioxins	2.22E-08	0.0001	2.22E-12
		2,3,7,8-TCDF	4.95E-09	0.1	4.95E-10 *
		1,2,3,7,8-PeCDF	2.48E-08	0.05	1.24E-09 *
		2,3,4,7,8-PeCDF	2.48E-08	0.5	1.24E-08 *
		1,2,3,4,7,8-HxCDF	1.46E-09	0.1	1.46E-10
		1,2,3,6,7,8-HxCDF	2.48E-08	0.1	2.48E-09 *
		2,3,4,6,7,8-HxCDF	2.48E-08	0.1	2.48E-09 *
		1,2,3,7,8,9-HxCDF	2.48E-08	0.1	2.48E-09 *
		1,2,3,4,6,7,8-HpCDF	2.14E-08	0.01	2.14E-10
		1,2,3,4,7,8,9-HpCDF	5.59E-09	0.01	5.59E-11
		Octachlorodibenzofurans	4.20E-08	0.0001	4.20E-12
2,3,7,8-TCDD Equivalent					
				5.92E-08	

- (a) Laboratory results are reported in pg/L=E-12 g/L or E-09 mg/L.
- (b) Toxicity Equivalency Factors from World Health Organization (WHO), 1998
- (c) TEQ = Toxicity Equivalent
- * Compound not detected so one half detection limit was entered.

Attachment 2-3
Calculation of 2,3,7,8-TCDD Equivalent
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas

Sample I.D.	Date Collected	Analyte	Conc. (mg/Kg) (a)	TEF (b)	TEQ Conc. (mg/Kg) (c)
WEEK 2	04/25/2007	2,3,7,8-TCDD	5.00E-07	1	5.00E-07 *
		1,2,3,7,8-PeCDD	5.95E-07	1	5.95E-07
		1,2,3,4,7,8-HxCDD	1.85E-06	0.1	1.85E-07
		1,2,3,6,7,8-HxCDD	2.38E-06	0.1	2.38E-07
		1,2,3,7,8,9-HxCDD	3.32E-06	0.1	3.32E-07
		1,2,3,4,6,7,8-HpCDD	4.98E-05	0.01	4.98E-07
		Octachlorodibenzo-p-dioxins	2.57E-04	0.0001	2.57E-08
		2,3,7,8-TCDF	1.77E-05	0.1	1.77E-06
		1,2,3,7,8-PeCDF	3.05E-06	0.05	1.53E-07
		2,3,4,7,8-PeCDF	3.20E-06	0.5	1.60E-06
		1,2,3,4,7,8-HxCDF	3.46E-05	0.1	3.46E-06
		1,2,3,6,7,8-HxCDF	3.43E-05	0.1	3.43E-06
		2,3,4,6,7,8-HxCDF	2.11E-05	0.1	2.11E-06
		1,2,3,7,8,9-HxCDF	5.26E-06	0.1	5.26E-07
		1,2,3,4,6,7,8-HpCDF	5.89E-04	0.01	5.89E-06
		1,2,3,4,7,8,9-HpCDF	1.10E-04	0.01	1.10E-06
		Octachlorodibenzofurans	1.13E-03	0.0001	1.13E-07
		2,3,7,8-TCDD Equivalent			2.25E-05

(a) Laboratory results are reported in pg/g=E-12 g/g or E-06 mg/Kg.

(b) Toxicity Equivalency Factors from World Health Organization (WHO), 1998

(c) TEQ = Toxicity Equivalent

* Compound not detected so one half detection limit was entered.

Attachment 2-4
Calculation of 2,3,7,8-TCDD Equivalent
Wastewater Treatment Biosludge
OxyChem
Inglewood, Texas

Sample I.D.	Date Collected	Analyte	Conc. (mg/L) (a)	TEF (b)	TEQ Conc. (mg/L) (c)
WEEK 2	04/25/2007	2,3,7,8-TCDD	4.76E-09	1	4.76E-09 *
		1,2,3,7,8-PeCDD	2.38E-08	1	2.38E-08 *
		1,2,3,4,7,8-HxCDD	2.38E-08	0.1	2.38E-09 *
		1,2,3,6,7,8-HxCDD	2.38E-08	0.1	2.38E-09 *
		1,2,3,7,8,9-HxCDD	2.38E-08	0.1	2.38E-09 *
		1,2,3,4,6,7,8-HpCDD	2.38E-08	0.01	2.38E-10 *
		Octachlorodibenz-p-dioxins	3.06E-08	0.0001	3.06E-12
		2,3,7,8-TCDF	4.76E-09	0.1	4.76E-10 *
		1,2,3,7,8-PeCDF	2.38E-08	0.05	1.19E-09 *
		2,3,4,7,8-PeCDF	2.38E-08	0.5	1.19E-08 *
		1,2,3,4,7,8-HxCDF	2.38E-08	0.1	2.38E-09 *
		1,2,3,6,7,8-HxCDF	5.19E-09	0.1	5.19E-10
		2,3,4,6,7,8-HxCDF	2.38E-08	0.1	2.38E-09 *
		1,2,3,7,8,9-HxCDF	2.38E-08	0.1	2.38E-09 *
		1,2,3,4,6,7,8-HpCDF	5.87E-08	0.01	5.87E-10
		1,2,3,4,7,8,9-HpCDF	9.08E-09	0.01	9.08E-11
		Octachlorodibenzofurans	1.16E-07	0.0001	1.16E-11
					5.79E-08
					2,3,7,8-TCDD Equivalent
					5.79E-08

- (a) Laboratory results are reported in pg/L=E-12 g/L or E-09 mg/L.
- (b) Toxicity Equivalency Factors from World Health Organization (WHO), 1998
- (c) TEQ = Toxicity Equivalent
- * Compound not detected so one half detection limit was entered.

Attachment 2-5
Calculation of 2,3,7,8-TCDD Equivalent
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas

Sample I.D.	Date Collected	Analyte	Conc. (mg/Kg) (a)	TEF (b)	TEQ Conc. (mg/Kg) (c)
WEEK 3					
	05/14/2007	2,3,7,8-TCDD	5.00E-07	1	5.00E-07 *
		1,2,3,7,8-PeCDD	8.61E-07	1	8.61E-07
		1,2,3,4,7,8-HxCDD	4.50E-06	0.1	4.50E-07
		1,2,3,6,7,8-HxCDD	5.96E-06	0.1	5.96E-07
		1,2,3,7,8,9-HxCDD	8.60E-06	0.1	8.60E-07
		1,2,3,4,6,7,8-HpCDD	1.27E-04	0.01	1.27E-06
		Octachlorodibenz-p-dioxins	7.27E-04	0.0001	7.27E-08
		2,3,7,8-TCDF	2.65E-05	0.1	2.65E-06
		1,2,3,7,8-PeCDF	7.54E-06	0.05	3.77E-07
		2,3,4,7,8-PeCDF	8.75E-06	0.5	4.38E-06
		1,2,3,4,7,8-HxCDF	1.49E-04	0.1	1.49E-05
		1,2,3,6,7,8-HxCDF	8.33E-05	0.1	8.33E-06
		2,3,4,6,7,8-HxCDF	5.17E-05	0.1	5.17E-06
		1,2,3,7,8,9-HxCDF	1.29E-05	0.1	1.29E-06
		1,2,3,4,6,7,8-HpCDF	1.56E-03	0.01	1.56E-05
		1,2,3,4,7,8,9-HpCDF	2.78E-04	0.01	2.78E-06
		Octachlorodibenzofurans	2.67E-03	0.0001	2.67E-07
2,3,7,8-TCDD Equivalent					
					6.03E-05

- (a) Laboratory results are reported in pg/g=E-12 g/g or E-06 mg/Kg.
- (b) Toxicity Equivalency Factors from World Health Organization (WHO), 1998
- (c) TEQ = Toxicity Equivalent
- * Compound not detected so one half detection limit was entered.

Attachment 2-6
Calculation of 2,3,7,8-TCDD Equivalent
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas

Sample I.D.	Date Collected	Analyte	Conc. (mg/L) (a)	TEF (b)	TEQ Conc. (mg/L) (c)
WEEK 3	05/14/2007	2,3,7,8-TCDD	2.38E-09	1	2.38E-09 *
		1,2,3,7,8-PeCDD	1.19E-08	1	1.19E-08 *
		1,2,3,4,7,8-HxCDD	1.19E-08	0.1	1.19E-09 *
		1,2,3,6,7,8-HxCDD	1.19E-08	0.1	1.19E-09 *
		1,2,3,7,8,9-HxCDD	1.19E-08	0.1	1.19E-09 *
		1,2,3,4,6,7,8-HpCDD	6.75E-09	0.01	6.75E-11
		Octachlorodibenzo-p-dioxins	2.53E-08	0.0001	2.53E-12
		2,3,7,8-TCDF	2.38E-09	0.1	2.38E-10 *
		1,2,3,7,8-PeCDF	1.19E-08	0.05	5.95E-10 *
		2,3,4,7,8-PeCDF	1.19E-08	0.5	5.95E-09 *
		1,2,3,4,7,8-HxCDF	5.32E-09	0.1	5.32E-10
		1,2,3,6,7,8-HxCDF	1.86E-09	0.1	1.86E-10
		2,3,4,6,7,8-HxCDF	1.19E-08	0.1	1.19E-09 *
		1,2,3,7,8,9-HxCDF	1.19E-08	0.1	1.19E-09 *
		1,2,3,4,6,7,8-HpCDF	6.12E-08	0.01	6.12E-10
		1,2,3,4,7,8,9-HpCDF	8.54E-09	0.01	8.54E-11
		Octachlorodibenzofurans	1.43E-07	0.0001	1.43E-11

2,3,7,8-TCDD Equivalent
2.85E-08

- (a) Laboratory results are reported in pg/L=E-12 g/L or E-09 mg/L.
- (b) Toxicity Equivalency Factors from World Health Organization (WHO), 1998
- (c) TEQ = Toxicity Equivalent
- * Compound not detected so one half detection limit was entered.

Attachment 2-7
Calculation of 2,3,7,8-TCDD Equivalent
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas

Sample I.D.	Date Collected	Analyte	Conc. (mg/Kg) (a)	TEF (b)	TEQ Conc. (mg/Kg) (c)
WEEK 4	05/22/2007	2,3,7,8-TCDD	5.00E-07 *	1	5.00E-07
		1,2,3,7,8-PeCDD	6.25E-07	1	6.25E-07
		1,2,3,4,7,8-HxCDD	3.55E-06	0.1	3.55E-07
		1,2,3,6,7,8-HxCDD	4.60E-06	0.1	4.60E-07
		1,2,3,7,8,9-HxCDD	5.85E-06	0.1	5.85E-07
		1,2,3,4,6,7,8-HpCDD	8.99E-05	0.01	8.99E-07
		Octachlorodibenzo-p-dioxins	4.62E-04	0.0001	4.62E-08
		2,3,7,8-TCDF	2.62E-05	0.1	2.62E-06
		1,2,3,7,8-PeCDF	5.51E-06	0.05	2.76E-07
		2,3,4,7,8-PeCDF	6.44E-06	0.5	3.22E-06
		1,2,3,4,7,8-HxCDF	6.54E-05	0.1	6.54E-06
		1,2,3,6,7,8-HxCDF	5.58E-05	0.1	5.58E-06
		2,3,4,6,7,8-HxCDF	3.50E-03	0.1	3.50E-04
		1,2,3,7,8,9-HxCDF	8.51E-06	0.1	8.51E-07
		1,2,3,4,6,7,8-HpCDF	1.08E-03	0.01	1.08E-05
		1,2,3,4,7,8,9-HpCDF	1.86E-04	0.01	1.86E-06
		Octachlorodibenzofurans	2.21E-03	0.0001	2.21E-07
		2,3,7,8-TCDD Equivalent	3.86E-04		

- (a) Laboratory results are reported in pg/g=E-12 g/g or E-06 mg/Kg.
 - (b) Toxicity Equivalency Factors from World Health Organization (WHO), 1998
 - (c) TEQ = Toxicity Equivalent
- * Compound not detected so one half detection limit was entered.

Attachment 2-8
Calculation of 2,3,7,8-TCDD Equivalent
Wastewater Treatment Biosludge
OxyChem
Ingleside, Texas

Sample I.D.	Date Collected	Analyte	Conc. (mg/L) (a)	TEF (b)	TEQ Conc. (mg/L) (c)
WEEK 4					
	05/22/2007	2,3,7,8-TCDD	2.38E-09	1	2.38E-09 *
		1,2,3,7,8-PeCDD	1.19E-08	1	1.19E-08 *
		1,2,3,4,7,8-HxCDD	1.19E-08	0.1	1.19E-09 *
		1,2,3,6,7,8-HxCDD	1.19E-08	0.1	1.19E-09 *
		1,2,3,7,8,9-HxCDD	1.19E-08	0.1	1.19E-09 *
		1,2,3,4,6,7,8-HpCDD	3.71E-09	0.01	3.71E-11
		Octachlorodibenzo-p-dioxins	1.61E-08	0.0001	1.61E-12
		2,3,7,8-TCDF	2.38E-09	0.1	2.38E-10 *
		1,2,3,7,8-PeCDF	1.19E-08	0.05	5.95E-10 *
		2,3,4,7,8-PeCDF	1.19E-08	0.5	5.95E-09 *
		1,2,3,4,7,8-HxCDF	3.07E-09	0.1	3.07E-10
		1,2,3,6,7,8-HxCDF	1.35E-09	0.1	1.35E-10
		2,3,4,6,7,8-HxCDF	1.19E-08	0.1	1.19E-09 *
		1,2,3,7,8,9-HxCDF	1.19E-08	0.1	1.19E-09 *
		1,2,3,4,6,7,8-HpCDF	3.41E-08	0.01	3.41E-10
		1,2,3,4,7,8,9-HpCDF	1.19E-08	0.01	1.19E-10 *
		Octachlorodibenzofurans	6.51E-08	0.0001	6.51E-12
		2,3,7,8-TCDD Equivalent			2.80E-08

- (a) Laboratory results are reported in pg/L=E-12 g/L or E-09 mg/L.
- (b) Toxicity Equivalency Factors from World Health Organization (WHO), 1998
- (c) TEQ = Toxicity Equivalent
- * Compound not detected so one half detection limit was entered.

Attachment 3
DRAS 2.0 Output Files

Delisting Samples Collected April – May 2007

Site and WMU Information

Delisting Petition Number:

DL-

File Name:

EDC/VCM Biosludge - delisting data

Petitioner's Name:

Occidental Chemical Corporation

Address 1:

Address 2:

City, State:

Ingleside,

Zip Code:

Analysis Performed by:

Lisa Arceneaux

Date of Analysis:

Jul-08-2007

Waste Description:

biosolids from the wastewater treatment system

Waste Code:

K019, K020, F025

WMU Type:

Landfill

Waste Volume (yd³):

3689

Active Life (years):

20

Risk Factor:

1.00E-05

HQ Factor:

1.00E+00

Select Chemicals of Concern to be Modeled (Steps 4 - 5)

Chemical Name	CAS Number	TCLP Concentration (mg/L)	TCLP Detection Limit	Total Concentration (mg/kg)	Total Detection Limit	Maximum Contaminant Level (MCL) (mg/L)	Carcinogenic Slope Factor - Oral (CSFO) (kg-day/mg)	Carcinogenic Slope Factor - Inhalation (CSI) (kg-day/mg)	Reference Dose - Oral (RFDO) (mg/kg-day)
Zinc	7440-66-6	2.40E-01	0.00E+00	4.41E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E-01
Acetone	67-64-1	1.70E-01	0.00E+00	6.90E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-01
Mercury	7439-97-6	5.00E-05	-1.00E+00	8.13E-03	0.00E+00	2.00E-03	0.00E+00	0.00E+00	1.00E-04
Arsenic	7440-38-2	2.65E-02	0.00E+00	3.62E+00	0.00E+00	5.00E-02	1.50E+00	1.51E+01	3.00E-04
Barium	7440-39-3	2.04E-01	0.00E+00	2.77E+01	0.00E+00	2.05E+00	0.00E+00	0.00E+00	7.00E-02
Beryllium	7440-41-8	1.00E-02	-1.00E+00	6.23E-02	0.00E+00	4.00E-03	0.00E+00	8.40E+00	2.00E-03
Chromium	7440-47-4	3.04E-02	0.00E+00	1.04E+01	0.00E+00	1.00E-01	0.00E+00	0.00E+00	1.50E+00
Vanadium	7440-62-2	5.86E-03	-1.00E+00	6.62E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E-03
Trichloroethylene	73-01-6	1.00E-03	-1.00E+00	5.00E-03	-1.00E+00	5.00E-03	1.10E-02	6.00E-03	6.00E-03
Thallium	7440-28-0	2.03E-03	0.00E+00	9.62E-02	0.00E+00	2.00E-03	0.00E+00	0.00E+00	8.00E-05
Cobalt	7440-48-4	7.44E-03	0.00E+00	7.37E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02
Methylene chloride	75-09-2	3.50E-02	0.00E+00	5.80E-03	0.00E+00	5.00E-03	7.50E-03	1.64E-03	6.00E-02
Benzoic acid	65-85-0	9.50E-03	0.00E+00	1.70E-01	-1.00E+00	0.00E+00	0.00E+00	0.00E+00	4.00E+00
Bis(2-ethylhexyl)phthalate	117-81-7	2.40E-03	0.00E+00	1.70E-01	-1.00E+00	6.00E-03	1.40E-02	0.00E+00	2.00E-02
TCDD, 2,3,7,8-	17-46-01-6	5.92E-03	0.00E+00	3.86E-04	0.00E+00	0.00E+00	1.50E+05	1.50E+05	0.00E+00
Copper	7440-50-8	2.74E-01	0.00E+00	4.41E+01	0.00E+00	1.30E+00	0.00E+00	0.00E+00	4.00E-02
Lecithin	7439-92-1	2.20E-03	-1.00E+00	2.70E+00	0.00E+00	1.50E-02	0.00E+00	0.00E+00	0.00E+00
Nickel	7440-02-0	2.90E-01	0.00E+00	2.51E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-02
Trichloroethane, 1,1,1-	71-55-6	1.00E-02	-1.00E+00	1.80E-03	0.00E+00	2.00E-01	0.00E+00	0.00E+00	3.50E-02
Toluene	108-88-3	1.20E-02	0.00E+00	5.00E-03	-1.00E+00	1.00E+00	0.00E+00	0.00E+00	2.00E-01
Ethybenzene	100-41-4	6.00E-03	0.00E+00	5.00E-03	-1.00E+00	7.00E-01	0.00E+00	0.00E+00	1.00E-01
Xylenes (total)	1330-20-7	4.80E-02	0.00E+00	1.50E-02	-1.00E+00	1.00E+01	0.00E+00	0.00E+00	2.00E+00

Select Chemicals of Concern to be Modeled (Steps 4-5)

Chemical Name	CAS Number	TCLP Concentration (mg/L)	TCLP Detection Limit	Total Concentration (mg/kg)	Total Detection Limit	Maximum Contaminant Level (MCL) (mg/L)	Carcinogenic Slope Factor - Oral (CSFo) (kg-day/mg)	Carcinogenic Slope Factor - Inhalation (CSFI) (kg-day/mg)	Reference Dose - Oral (RFDo) (mg/kg-day)
Antimony	7440-36-0	2.63E-03	5.00E+00	3.49E-01	0.00E+00	5.00E-03	0.00E+00	0.00E+00	4.00E-04
Cadmium	7440-43-9	6.16E-04	0.00E+00	1.24E-01	0.00E+00	5.00E-03	0.00E+00	6.30E+00	5.00E-04
Selenium	7732-49-2	7.70E-03	0.00E+00	6.33E-01	0.00E+00	5.00E-02	0.00E+00	0.00E+00	5.00E-03
Silver	7440-22-4	1.00E-02	-1.00E+00	9.81E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03
Tin	7440-31-5	1.00E-02	-1.00E+00	1.59E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.00E-01
Naphthalene	91-20-3	6.60E-04	0.00E+00	6.60E-03	-1.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-02
Phenanthrene	35-01-8	2.30E-04	0.00E+00	6.60E-03	-1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.50E+00
Trichlorophenoxypropior and 2,4,5-/Silver	93-72-1	1.00E-04	-1.00E+00	1.10E-02	0.00E+00	5.00E-02	0.00E+00	0.00E+00	8.00E-03

Maximum Allowable Total Concentrations - Surface Exposure Pathways

Maximum Allowable Total Concentrations - Surface Exposure Pathways								
Chemical Name	Waste Stream Total Concentration (mg/Kg)	Maximum Allowable Total Concentration (mg/kg)	DL	Surface Water Ingestion Pathway	Air Particulate Inhalation Pathway	Fish Ingestion Pathway	Soil Ingestion Pathway	Air Volatile Inhalation Pathway
Risk Factor = 1.00E-05 HQ Factor = 1.00E+00 * = Detection Limit								
Zinc	4.41E+01	1.44E+07	9.71E+09	—	1.44E+07	3.75E+08	—	—
Acetone	6.90E-02	1.25E+08	3.24E+09	—	7.85E+09	1.25E+08	—	—
Mercury	8.13E-03	1.53E+00	3.24E+05	1.59E+06	1.53E+00	1.25E+05	1.37E+05	—
Arsenic	3.62E+00	2.62E+04	4.20E+05	7.98E+04	2.62E+04	7.37E+04	—	—
Boron	2.77E+01	9.23E+06	2.27E+06	9.23E+06	2.20E+09	8.74E+07	—	—
Beryllium	6.23E-02	1.43E+05	—	1.43E+05	—	—	—	—
Chromium	1.04E+01	8.66E+06	4.85E+10	—	8.66E+06	1.87E+09	—	—
Vanadium	6.62E+00	8.74E+06	2.27E+08	—	2.20E+08	8.74E+06	—	—
Trichloroethylene	5.00E-03	1.87E+02	*	5.73E+07	2.01E+08	1.72E+06	1.00E+07	1.87E+02
Thallium	9.62E-02	1.79E+03	2.58E+06	—	1.79E+03	9.99E+04	—	—
Cobalt	7.87E-01	7.49E+07	1.94E+08	—	1.83E+09	7.49E+07	—	—
Methylene chloride	5.80E-03	1.01E+02	8.40E+07	7.34E+08	1.98E+07	1.47E+07	1.01E+02	—
Benzoic acid	1.70E-01	5.00E+09	*	1.29E+11	—	7.95E+09	5.00E+09	—
Bis(2-ethylhexyl)phthalate	1.70E-01	4.31E+05	*	4.50E+07	8.60E+07	4.31E+05	7.89E+06	9.73E+08
TCDD, 2,3,7,8-	3.86E-04	7.37E-01	4.20E+00	8.03E-00	1.54E+05	7.37E-01	1.30E+05	—
Copper	4.41E+01	5.00E+07	1.29E+09	—	1.26E+09	5.00E+07	—	—
Liquid	2.70E+00	4.43E+05	—	4.43E+05	—	1.60E+06	—	—
Nickel	2.51E+01	2.04E+06	6.47E+08	—	2.04E+06	2.50E+07	—	—
Trichloroethane, 1,1,1-	1.60E-03	1.54E+03	1.13E+09	5.28E+09	2.69E+07	4.37E+07	1.54E+03	—
Toluene	5.00E-03	1.00E+08	*	6.47E+09	—	1.00E+08	2.50E+08	—

Maximum Allowable Total Concentrations - Surface Exposure Pathways

Chemical Name		Waste Stream Total Concentration (mg/Kg)	Maximum Allowable Total Concentration (mg/kg)	DL	Surface Water Ingestion Pathway	Air Particulate Inhalation Pathway	Fish Ingestion Pathway	Soil Ingestion Pathway	Air Volatile Inhalation Pathway
Risk Factor = 1.00E-05									
HQ Factor = 1.00E+00									
<b">* = Detection Limit</b">									
<i>Ethylbenzene</i>		5.00E-03	2.61E-04	*	3.24E+09	5.28E+09	2.26E+07	1.25E+08	2.61E+04
<i>Xylenes (total)</i>		1.50E-02	8.37E-08	*	6.47E+02	—	8.37E+08	2.50E+09	—
<i>Antimony</i>		3.49E-01	3.14E+05		1.20E+07	—	3.14E+05	5.00E+05	—
<i>Cadmium</i>		1.24E-01	6.28E+04		1.62E+07	—	6.28E+04	6.24E+05	—
<i>Selenium</i>		6.33E-01	1.22E+06		1.62E+08	—	1.22E+06	6.24E+06	—
<i>Silmer</i>		9.81E-02	7.70E+05		1.62E+08	—	7.70E+05	6.24E+06	—
<i>Tin</i>		1.55E+00	7.49E+08		1.94E+10	—	1.83E+10	7.49E+08	—
<i>Naphthalene</i>		6.60E-03	3.11E+04	*	6.47E+08	5.54E+07	2.92E+06	2.50E+07	3.11E+04
<i>Perynanthrene</i>		6.60E-03	*	—	—	—	—	—	—
<i>Trichlorophenoxypropionic acid, 2,4,5-(Silvery)</i>		1.10E-02	1.93E+06		2.59E+08	—	1.93E+06	9.99E+06	—

Maximum Allowable TCLP Concentrations - Groundwater Exposure Pathways

Max. Allowable Concentration Based on MCL
—
—
1.36E-01
1.20E+00
1.97E-01
—
—
1.97E+00

Maximum Allowable TCLP Concentrations - Groundwater Exposure Pathways

Chemical Name	Waste Stream TCLP Concentration (mg/L)	Dilution Attenuation Factor (DAF)	Waste Volume Adjusted DAF	Maximum Allowable Concentration (mg/L)	DL	Max. Allowable Concentration Based on Groundwater Ingestion Pathway	Max. Allowable Concentration Based on Adult Groundwater Dermal Absorption Pathway	Max. Allowable Concentration Based on Child Groundwater Dermal Absorption Pathway
Risk Factor = 1.00E-05 HQ Factor = 1.00E+00 * = Detection Limit								
Ethybenzene	8.00E-03	1.90E+01	3.93E+01	2.75E+01	1.43E-02	2.08E+02	2.34E+02	1.06E+02
Toluene	1.20E-02	1.90E+01	3.93E+01	3.93E+01	2.95E+02	—	8.03E+02	3.69E+02
Bis(2-ethylhexyl)phthalate	2.40E-03	1.90E+01	3.93E+01	2.36E-01	2.95E+01	—	1.41E+01	6.45E+00
Xylenes (total)	4.80E-02	1.90E+01	3.93E+01	3.93E+02	2.95E+03	—	4.50E+03	2.07E+03
TCDD, 2,3,7,8-	5.92E-03	1.80E+01	3.72E+01	4.23E-09	1.81E-07	4.00E-06	4.23E-09	9.71E-05
Benzoic acid	9.50E-03	1.80E+01	3.72E+01	5.59E+03	5.59E+03	—	—	—
Acetone	1.70E-01	1.90E+01	3.93E+01	1.48E+02	1.48E+02	—	4.19E+04	1.92E+04
Trichloroethane, 1,1,1-	1.00E-02	1.90E+01	3.93E+01	7.86E+00	*	5.17E+01	7.91E+02	4.91E+01
Lead	2.20E-03	5.00E+03	1.03E+04	1.55E+02	*	—	—	—
Mercury	5.00E-05	7.45E+01	1.54E+02	1.68E-01	*	5.79E-01	1.68E-01	—
Nickel	2.90E-01	3.75E+01	7.79E+01	5.85E+01	5.85E+01	—	—	—
Silver	1.00E-02	2.05E+01	4.23E+01	7.94E+00	*	7.94E+00	—	—
Thallium	2.03E-03	4.40E+01	9.10E+01	1.82E-01	2.73E-01	—	—	—
Tin	1.00E-02	—	—	*	—	—	—	—
Antimony	2.63E-03	3.43E+01	7.10E+01	4.26E-01	1.07E+00	—	—	—
Arsenic	2.65E-02	1.92E+01	3.97E+01	1.94E-02	1.94E-02	—	—	—
Barium	2.04E-01	2.78E+01	5.76E+01	1.15E+02	1.51E+02	—	—	—
Beryllium	1.00E-02	1.04E+02	2.15E+02	8.61E-01	*	1.62E+01	—	—
Cadmium	6.16E-04	3.00E+01	6.21E+01	3.10E-01	1.17E+00	—	—	—
Chromium	3.04E-02	3.85E+03	7.97E+03	7.97E+02	4.49E+05	—	—	—
Cobalt	7.44E-03	—	—	—	—	—	—	—
Copper	2.74E-01	7.01E+03	1.45E+04	1.88E+04	2.18E+04	—	—	—

Maximum Allowable TCLP Concentrations - Groundwater Exposure Pathways

Max. Allowable Concentration Based on MCL
2.75E+01
3.93E+01
2.36E-01
3.93E+02
—
—
—
—
7.86E+00
1.55E+02
3.06E-01
—
—
1.32E-01
—
4.26E-01
1.99E+00
1.15E+02
8.61E-01
3.10E-01
7.97E+02
—
1.88E+04

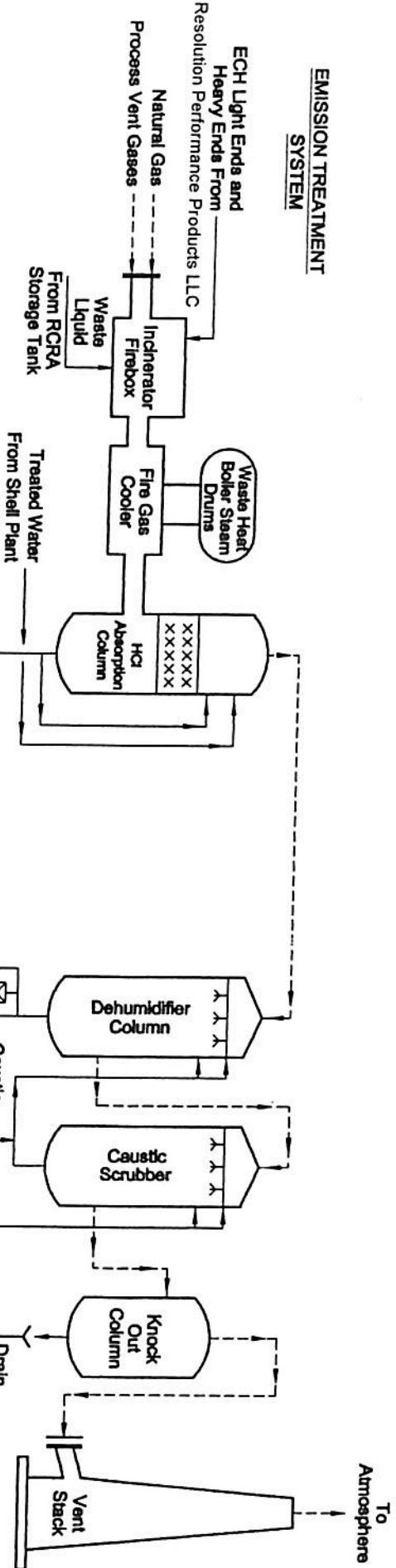
Maximum Allowable TCLP Concentrations - Groundwater Exposure Pathways

Chemical Name	Waste Stream TCLP Concentration (mg/L)	Dilution Attenuation Factor (DAF)	Waste Volume Adjusted DAF	Maximum Allowable Concentration (mg/L)	DL	Max. Allowable Concentration Based on Groundwater Ingestion Pathway	Max. Allowable Concentration Based on Adult Groundwater Dermal Inhalation Pathway	Max. Allowable Concentration Based on Child Groundwater Dermal Absorption Pathway
Risk Factor = 1.00E-05 HQ Factor = 1.00E-00 * = Detection Limit								
Vanadium	5.86E-03	8.03E+01	1.66E+02	4.37E+01	*	4.37E+01	—	—
Zinc	2.40E-01	2.49E+01	5.15E+01	5.80E+02	5.80E+02	—	—	—
Methylenedichloride	3.50E-02	1.80E+01	3.72E+01	1.86E-01	3.35E+01	5.22E+02	2.51E+02	1.5E+03
Selenium	7.70E-03	1.16E+01	2.40E+01	1.20E+00	4.50E+00	—	—	—
Trichloroethylene	1.00E-03	1.90E+01	3.93E+01	1.97E-01	*	8.86E+00	—	—
Phenanthrene	2.80E-04	1.80E+01	3.72E+01	—	—	—	1.29E+01	5.78E+00
Naphthalene	6.60E-04	1.90E+01	3.93E+01	2.68E+00	2.95E+01	2.68E+00	3.81E+01	1.75E+01
Trichlorophenoxypropionic acid, 2,4,5,6-tetrachloro- ¹⁴ C	1.00E-04	1.90E+01	3.93E+01	1.97E+00	*	1.18E+01	—	4.81E+01
						3.93E+01		

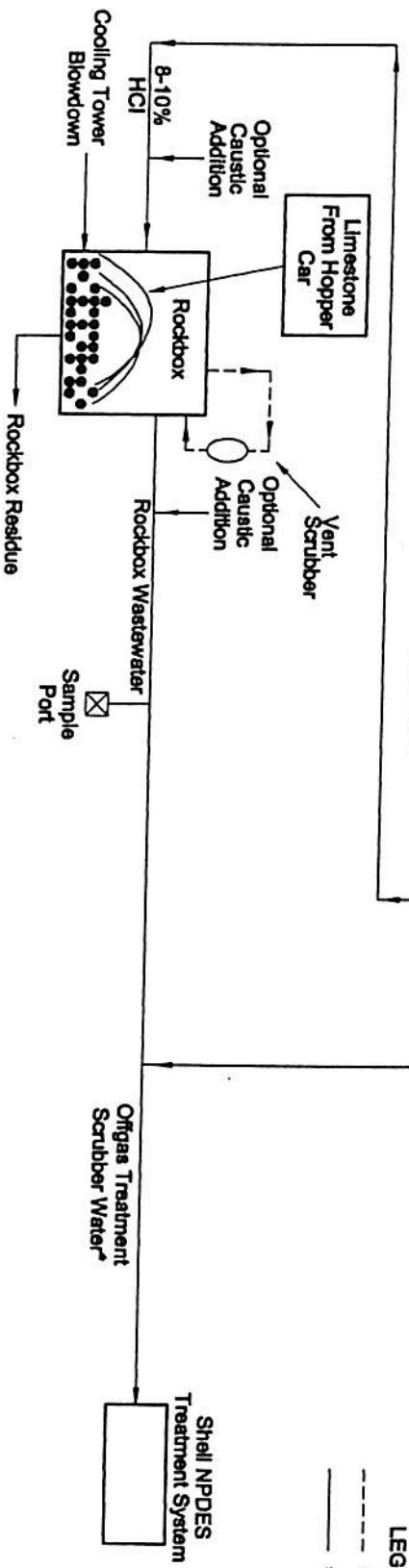
Maximum Allowable TCLP Concentrations - Groundwater Exposure Pathways

Max. Allowable Concentration Based on MCL
—
—
1.86E-01
1.20E+00
1.97E-01
—
—
1.97E+00

EMISSION TREATMENT SYSTEM



AQUEOUS TREATMENT SYSTEM



(1) ECH = Epichlorohydrin

* Waste stream covered by this Sampling and Analysis Plan.

Figure 3-1

DATE:	8/13/01
FILE NAME:	Figure1-1.dwg

Simplified Process Flow Diagram - Incinerator Offgas Treatment
OxyVinyls, LP Houston Operations Deer Park VCM Plant